

amalgamation of the wealth of recently published research. Most chapters are well illustrated, and all conclude with a clear summary and a brief guide to further reading. The concise style of the book is established in the introductory chapter which considers, in just seven pages, the work of the wind and global wind patterns. Chapter 2 leads the reader gently through an account of the mechanics of grain motion in air. This is a neat summary which manages skilfully to blend the developments of the past three years or so with the established physical principles of the processes involved. Unfortunately, a number of errors erode the authority of this chapter somewhat. For example, the sand trap shown in Figure 2.9(a) is not, as stated, a 'Leatherman trap', and the transport history depicted in Figure 2.10 is not from the wind tunnel measurements of Butterfield (1993) but from the numerical simulation model of McEwan (1991). Despite such errors, this is a very useful exposition of contemporary understanding.

The erosive work of wind is then given brief but significant recognition in the third chapter, before more substantial discussion of dust in Chapter 4. The latter deals with measurement, motion, sources and sinks of dust, and despite the succinct treatment, leaves the reader in no doubt regarding both the distinctiveness and importance of dust-related processes and landforms.

The considerable field experience of both authors is particularly evident in the treatments of aeolian dunes (Chapter 5) and sand seas, dunefields and sand sheets (Chapter 6). These chapters are both skilful syntheses of a now vast literature and, in many respects, form the core of the book. The geographical coverage is impressive and, in contrast to most previous texts, both desert and coastal dunes are discussed. This treatment ably demonstrates the complementarity of aeolian geomorphology with coastal, desert and arid-zone geomorphology, as well as the benefits of recent multi-disciplinary research.

Chapter 7 promises to introduce 'some key concepts about aeolian sand deposits' (p. 112) but deals almost exclusively with the textural properties of dune sands and with our primitive knowledge of the sedimentary structure of aeolian dunes. This is little more than a stimulating if tantalizing glimpse of a beckoning research frontier. The final two chapters deal with palaeoenvironments and aspects of applied aeolian geomorphology. The latter sets the rest of the book in context by consideration of wind erosion of agricultural soils, control of dust and sand drifting, and the

management of dunes in coastal and arid environments. The similarity of management problems in diverse aeolian environments is readily apparent from the final chapter, but the reader is reminded that any technological 'fixes' are constrained by a cultural subtext.

Overall, this excellent book provides the reader with a concise yet thoroughly contemporary overview of the processes and landforms of the aeolian world at spatial scales ranging from individual grains to sand seas, and at temporal scales ranging from those of saltation cloud response to climatic change. Throughout, the authors' collective wealth of field experience gives the book a commendable authority, and they have skilfully integrated both new and established ideas by judicious utilization of an extensive bibliography. The glossary of terms is a particularly welcome additional element.

Accessible texts at undergraduate level abound in other branches of geomorphology, but this is one of few such texts on aeolian geomorphology; consequently, it fills an obvious niche in the market. It is a well written, easily understood and highly informative book which makes a significant contribution to the continuing growth of aeolian geomorphology. Undergraduate students will find it an invaluable introduction to the geomorphology of windy environments; academics and professionals with an interest in aeolian processes, forms or management will find it a useful 'state-of-the-art' summary, as well as enjoyable to read. I will be surprised if this book does not become the principal teaching resource for courses, or parts of courses, dealing with aeolian geomorphology at the undergraduate level.

References

- Butterfield G. R. 1993. 'Sand transport response to fluctuating wind velocity', in Clifford, N. J., French, J. R. and Hardisty, J. (Eds), *Turbulence: Perspectives on Flow and Sediment Transport*, John Wiley and Sons, Chichester, 305–335.
McEwan, I. K. 1991. *The Physics of Sand Transport by Wind*, unpublished PhD thesis, University of Aberdeen, 121 pp.

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GLACIAL GEOLOGY: ICE SHEETS AND LANDFORMS
by Matthew R. Bennett and Neil F. Glasser, John Wiley and Sons Ltd, Chichester, 1996. No. of pages: x+364. Price: £19.99 (pb). ISBN 0-471-963445-3.

According to the authors, this book is the product of two things: an enthusiasm for glacial geology, and a perceived need for a student text to stimulate this enthusiasm in others. Thus, it aims to provide an accessible account of glacial geology, uncluttered by unnecessary detail. In this, I feel it generally succeeds. The book uses a simple, logical chapter sequence, which progresses through a brief review of the

history of ice on Earth, into two chapters which provide a simple account of mass balance and ice flow, and then the production of, and role played by, glacial meltwater. These chapters are followed by two reviewing processes of glacial erosion and the resulting landforms, and five covering the processes of glacial transport, glacial sedimentation on land and the resulting landforms, and glacial sedimentation in water and the resulting landforms. It concludes with a chapter introducing the interpretation of glacial landscapes. Each chapter consists of a 'core' introducing the material under consideration, and a series of 'boxes' which provide more detailed illustrations of the subject, taken from papers in the

literature. This structure has advantages and disadvantages. Whilst it means the 'core' reads quite easily, it is sometimes easy to lose the thread of the main discussion when one returns from reading a 'box'. The boxes themselves draw on a wide variety of material, including both widely cited 'classic' papers, and more up-to-date research. The chapters conclude with a summary, a useful guide through the material cited in the chapter, and additional suggested reading. The chapters dealing with landforms also have useful summary tables, describing the main characteristics of the landforms discussed, and their significance for glacial reconstructions. The text uses a minimum of equations, preferring to present qualitative explanations of the physical processes under discussion, with a liberal use of figures. While this means the book succeeds in forming a simple introduction to the subject, one has to hope that the enthusiasm it does stir in

students is not short-lived once they start to follow up the suggested reading. Whilst respecting the authors' aims of avoiding unnecessary detail, and notwithstanding the bias of the book towards describing glacial landforms rather than glacial processes, I feel that a little more use of mathematics, together with the qualitative interpretations, would ease students into the literature a little more gently, especially in the areas of ice dynamics, glacial hydrology and glacier erosion. This personal caveat aside, however, I feel this book provides a useful, up-to-date introduction to glacial geology, that complements other, more process-based texts.

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GEOMORPHOLOGY SANS FRONTIÈRES edited by S. Brian McCann and Derek C. Ford, Wiley, New York, 1996. No. of pages: xiii+245. Price: \$50.00 (hb). ISBN 0-471-96600-2.

I am sorry to see a good title wasted on a disappointing book. We have here various special pieces from the *Third International Geomorphology Conference* in Canada. There are five invited papers including Ahnert (models), Ota (coral reefs), Rapp (are they nunataks?), and two Canadian contributions, Ford (karst in a cold climate) and Shaw (meltwater formed all the glacial features of Canada). These are in the main authoritative and in several cases hold the attention well, perhaps Rapp best of all. Shaw is the wild card; I think the Canadian organizers lost an opportunity to match his interesting ideas with a more conventional approach which actually believes that glaciers can perform geomorphological work. No doubt many of the landscapes Shaw describes do bear signs of effective work by subglacial meltwater, but that is not to deny the work of ice – and the evidence for that is simply omitted.

The opening paper is Denys Brunsden's Presidential Address, an indulgent piece which includes bits of ethics and ruminations about transborder problems over water resources and river management, with a core of examples of work done. As a confirmed academic who from time to time is prepared to give advice or in other ways to interfere in practical

problems, I am rarely persuaded by these attempts to justify straying from the path of real research. As for the issue of the 'Chartered Geomorphologist', it should be noted that most of this work is actually done by interdisciplinary teams.

Sandwiched between these items is a discussion of Brunsden's Frankfurt paper 'Tablets of stone' with its unhappy subtitle, 'the ten commandments of geomorphology'. Six distinguished discussants are followed by a rather apologetic response from the author. The problem with this bright idea is that the original is too weak to sustain the attention; it is neither a strong theoretical statement, nor a set of operational guides. Indeed, going back to read it, I was reminded that the rest of the Frankfurt volume¹ is far better, both in content, and in its form of publication, than this book. As a final niggle, despite the title, few foreign papers are cited by the English-speaking authors here, and those that are usually appear without accents. Having managed *Frontières* in the title, I would have thought Büdel within reach.

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REFERENCE

- ¹ Geomorphology and Geoecology. General, invited and special lectures, *Zeitschrift für Geomorphologie, Supplementband*, 79, 1990, 216 pp.

GEOMORPHOLOGY OF DESERT DUNES by N. Lancaster, Routledge, London, 1995. No. of pages: xix+290. Price: £55.00 (hb), £17.99 (pb). ISBN 0-415-06093-1 (hb), 0-415-06094-X (pb).

When Nick Lancaster writes another book about desert dunes, we should all pay extra attention. He has the longest and most consistent record of work in dunes among geomorphologists, having published major contributions to almost all their geomorphological aspects, from sediments, through dynamics and form to geological history, and he has

worked in some of the most exciting field locations. Moreover, the rapid advances in the field in the last decade create an urgent need for reassessments of research like this, for workers in the field and for outsiders. Although the discipline is still firmly based on the amazingly secure foundations laid by Bagnold, he would scarcely have recognized the superstructure that is developing. As Lancaster himself says, aeolian geomorphology has 'come of age'.

The *Geomorphology of Desert Dunes* splices Lancaster's own work to that of the small band of others who are contributing to the advance. A discussion of sand movement